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Remedial Design Work Plan

Remedial Design
Old American Zinc Plant Site
Fairmont City, Illinois

May 2015

ARCADIS

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List of Acronyms/Abbreviations

AOC	Administrative Order on Consent
ASTM	American Standards for Testing Materials
AFTL	ARCADIS Field Team Leader
ASTM	American Standards for Testing Materials
BHHRA	Baseline Human Health Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)
COC	Chain of Custody
COPEC	Constituents of Potential Environmental Concern
CLP	Contract Laboratory Program
DQO	Data Quality Objective
EFTL	ENTACT Field Team Leader
FSP	Field Sampling Plan
FTL	Field Team Leader
HASP	Health and Safety Plan
IC	Institutional Control
IEPA	Illinois Environmental Protection Agency
ISA	Integrated Site Assessment
LQM	Laboratory Quality Manual
MS/MSD	Matrix Spike/ Matrix Spike Duplicate
mg/kg	Milligrams per kilograms
O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbons
PARCC	Precision, Accuracy, Representativeness, Completeness, Comparability
PPE	Personal Protective Equipment
PCBs	Polychlorinated Biphenyls
PDI	Pre-Design Investigation
PDIR	Pre-Design Investigation Report
PID	Photo-ionization Detector
RPM	Remedial Project Manager
QA	Quality Assurance
QA/QC	Quality Assurance/ Quality Control
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
PDR	Preliminary Design Report
RDWP	Remedial Design Work Plan

RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPD	Relative Percent Differences
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/ Feasibility Study
RPM	Remedial Project Manager
SMC	Sample Management Coordinator
SOP	Standard Operating Procedure
SOW	Statement of Work
SPLP	Synthetic Precipitation Leaching Procedure
SRM	Standard Reference Materials
SSO	Site Safety Officer
SSP	Support Sampling Plan
STL	Severn Trent Laboratory
SVOC	Semi Volatile organic Compounds
SW846	Test Methods for Evaluating Solid Waste 1986.
TAL	Target Analyte List
TAT	Turn-Around-Time
TCL	Target Compound List
TCRA	Time-Critical Remedial Action
TPM	Technical Project Manager
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
XRF	X-Ray Fluorescence
TCLP	Toxicity Characteristic Leaching Procedure

1. Introduction

This Remedial Design (RD) Work Plan for the Old American Zinc Superfund Site (the Site) in Fairmont City, Illinois has been prepared by ARCADIS U.S. Inc. (ARCADIS) on behalf of Blue Tee Corp. (Blue Tee). This RD Work Plan is being submitted in accordance with the Administrative Order on Consent and Settlement Agreement for Remedial Design (CERCLA Docket No. V-W-14.C-011).

Remedial Investigation/Feasibility Study (RI/FS) activities were conducted at the Site from 2005 to 2012. The final RI Report was approved by the U.S. Environmental Protection Agency, Region 5 (USEPA) in April, 2009 and the final FS Report was approved by USEPA in March, 2012.

The USEPA issued a Record of Decision (ROD) for the remediation of the Site on September 11, 2012.

As documented in the ROD the USEPA selected Alternative 4A from the FS as the remedy for the Site, the primary components of the Remedial Design (RD) of the selected remedy include:

- Excavation of vitrified slag, redistributed ground slag, and affected soils and sediments inside the Facility Area, then consolidation into a 35-acre consolidation area on the Facility Area.
- Removal of affected soils and sediments outside the Facility Area to be managed with consolidated media inside the 35-acre consolidation area.
- Capping the consolidated affected media with a 24-inch, low-permeability, compacted soil barrier layer with a hydraulic conductivity no greater than $1xI0^{-7}$ cm/sec and a 12-inch vegetated layer cover system.
- Institutional Controls (ICs) in accordance with the Illinois Uniform Environmental Covenants Act to achieve the following: 1) prohibit future residential land use on the 35- acre consolidation area and select off-site properties that are not likely to be used for future residential development; 2) control access to engineered components of the remedy and prohibit intrusive activities in capped areas to maintain the effectiveness of the cap; and 3) prohibit the installation of potable wells and use of shallow groundwater within the affected groundwater plume until all groundwater cleanup standards have been achieved to ensure long-term protection of human health.
- Drainage controls on manmade ditches draining the Facility Area.
- Stormwater and groundwater monitoring.

- Implementation of long-term operation and maintenance (O&M) activities to maintain the integrity of the cover system and other components of the remedy.
- A groundwater management zone will be established pursuant to regulations in the Illinois Administrative Code related to Groundwater Quality (35 IAC, Subtitle F, Chapter I, Part 620).

Detailed information regarding the distribution of impacts is presented in Section 2. Individual elements of the Remedial Design and deliverables associated with the design are discussed in Sections 3 and 4. Project management, organization, and schedule are presented in Sections 5 and 6.

1.1 Purpose

The RD Work Plan is intended to summarize the activities to be undertaken to complete the RD for the Site as described in the ROD and the August, 2014 AOC. This RD Work Plan presents the overall management strategy for the design of the excavation, consolidation and capping, and identifies the key design personnel and technical approach that will be used to complete the design for each of the components of the selected remedial action. A schedule for the remedial design activities that identifies major milestones anticipated during the remedial design is also provided in this RD Work Plan.

Pre-design investigations (PDI) will be conducted as part of the RD for the Site to collect the necessary additional data to design the full-scale implementation for the selected remedy. Pre-design data collection will be utilized to answer key questions, and provide sufficient data upon which to make sound design decisions for the full-scale remedial action. The proposed pre-design activities include:

- Installation of groundwater wells and groundwater sampling to define the down-gradient extent of Site-related exceedances of applicable federal and state standards;
- Soil sampling of the 29 residential, commercial/industrial or vacant properties that include properties sampled as part of the Time Critical Removal Action (TCRA) or RI for which there is currently insufficient data to determine if remedial action is required, as well as properties not previously sampled due to denial of access for sampling.
- Trenching to identify and locate the extent of existing void spaces (utility trenches and basements) within the proposed consolidation area and trenching within the footprints of former buildings in the Excavation Area to provide

additional data for estimating the nature, extent and quantity of buried materials to be addressed as part of the remedy;

- Trenching to facilitate the collection and analysis of samples to characterize previously encountered buried tarry waste material; and
- On-Site test pits to identify possible borrow areas.

2. Site Background

The OAZ Site (IL000034355) is located in Fairmont City, Illinois, and consists of an approximately 132-acre Facility Area where former zinc smelting operations were conducted, and areas surrounding the Facility Area where elevated concentrations of metals associated with the historic smelter operations were found in various media. The Site includes the following areas:

1. The Facility Area;
2. Residential, commercial, and vacant properties around the Facility Area;
3. Alleyways owned by the Village of Fairmont City that have been filled or surfaced with slag;
4. Drainage ways, including the West Ditch and the West Ditch outfall, that receive drainage from the Facility Area; and
5. Shallow groundwater within and immediately adjacent to the Facility Area.

The approximate Site area is shown on Figure 1.

The area encompassing the Site lies within the Upper Alluvial Valley of the Mississippi River flood plain of the Springfield Plain Subdivision of the Till Plains Section of the Central Lowland Province. The general topography is relatively flat and is at a general elevation between 400 and 420 feet above mean sea level with a regional slope of 5 to 10 feet per mile to the southwest. A terrace slope generally running parallel and north of Collinsville Road separates the Upper Alluvial Valley, where the Facility Area is located, from the American Bottoms, a low elevation bottomland that covers approximately 175 square miles and is approximately 30 miles long and 11 miles across at its widest point.

2.1 Historical Site Operations

The Facility Area was historically used as a primary zinc smelter between 1916 and 1953 and produced slab zinc, zinc carbonate, cadmium, lead, and sulfuric acid. The primary residue generated during the smelter's operation was slag which was poured

along the northern and western boundary of the Facility Area in a molten state and allowed to cool over time. According to historical aerial photographs, the slag piles originally encompassed more than 15 acres. At some later date, the vitrified slag was allegedly transported to areas outside the Facility Area by employees from the village, local business personnel, and area residents for use as fill and surfacing material.

American Zinc entered into an “Agreement of Lease” with the Defense Plant Corporation (DPC) and Metals Reserve Company (MRC) in 1941 to meet the increased zinc production needs of the county during World War II. DPC constructed additional facilities, and brought additional smelting equipment and machinery to the Site, including a zinc roaster, an acid plant, a Waelz plant to produce lead, two zinc furnaces, and a cadmium furnace. These facilities were all owned by DPC, and were leased back to and operated by American Zinc. American Zinc purchased the facilities from DPC in April 1951. The MRC purchased and delivered metal concentrates to the smelter for smelting during the period it operated at the Site.

The zinc furnace operations ceased in 1953, with subsequent operations limited to roasting ores for other smelter facilities and the production of sulfuric acid. These roasting operations continued until 1967 when American Zinc discontinued all operations. Based on aerial photographs, all buildings and other facilities associated with former smelting operations were razed in the late 1960s.

XTRA leased the Facility Area property from American Zinc (now Blue Tee) between 1976 and 1979 and purchased the property in 1979, including the clinker and other smelter residues, minerals or metals located on the property. From 1976 to sometime after 2003, XTRA operated a transport trucking terminal on the Facility Area which included the lease, storage, and maintenance of a diverse fleet of over-the-road trailers, intermodal ("piggy- back") trailers, and intermodal equipment. Beginning in 1976, XTRA ground and redistributed the stockpiled slag across the Facility Area to build up and level the Facility Area for its trucking operations.

2.2 Early Investigations and Response Actions

Investigations of the Site were conducted by Illinois Environmental Protection Agency (IEPA) in 1994 in response to citizen complaints of blowing dust from the Facility Area resulting from grinding of vitrified slag by XTRA for use as structural fill for its operations. An additional investigation was conducted by Ecology & Environment for USEPA in 1995 that included the collection of soil and sediment samples from the Facility Area and adjacent residential properties. The sampling conducted by USEPA

and IEPA found heavy metals in Facility Area slag, soils, stream sediments, and adjacent residential properties at levels greater than background or risk-based screening levels. Based on this sampling, USEPA requested that PRP Blue Tee perform a TCRA at the Site. An Administrative Settlement Agreement and AOC was entered into between PRP Blue Tee and USEPA on March 22, 2002 to conduct a TCRA to address soils containing lead concentrations above the action level of 400 milligrams per kilogram (mg/kg) for residential properties and 1,000 mg/kg for commercial/ industrial properties. Vacant lots were also sampled as part of the TCRA and a removal action was taken at vacant lots located adjacent to residential areas if the vacant lots had soil lead concentrations greater than 1,200 mg/kg.

The 2002-2003 TCRA included the sampling of 462 residential, commercial/industrial and vacant properties for lead, arsenic, cadmium, and zinc. Of the 462 properties sampled during the TCRA, 209 properties were found to have soil lead concentrations in excess of the USEPA approved action levels. Of these, soil removal actions were performed on 152 properties. The remaining 57 properties are composed of 49 vacant lots with soil lead concentrations less than 1,200 mg/kg, and eight residential properties where permission to conduct the removal action was not granted by the property owner.

On June 6, 2005, PRPs Blue Tee and GSA entered into an AOC to conduct a RI/FS for the Site. An RI was conducted at the Site from May 2006 to January 2008. Additional detail about Site characteristics is provided in the Final RI Report which was approved by USEPA in April 2009. The Final FS Report was approved by USEPA in March 2012.

2.3 Site Characterization

The Facility Area is an inactive; approximately 132-acre parcel located in the southeast quarter of Section 4, Township 2 North, Range 9 West in St. Clair County, Illinois. The Facility Area is immediately bordered by commercial or industrial facilities to the south, west and east. The majority of the residential properties in the vicinity of the Facility Area are located west of the Facility Area, with smaller pockets of residential or trailer park developments to the north, south and east. The Facility Area features are shown in Figure 1. The residential, commercial/industrial and vacant properties surrounding the Facility Area include properties which may have been affected by historic smelting operations primarily through the redistribution of slag used as fill or surfacing materials. As noted earlier a total of 462 of these properties located in Fairmont City and the adjacent community of Washington Park were sampled for lead, arsenic, cadmium and

zinc as part of a 2002-2003 TCRA at the Site. An additional 25 residential, vacant or commercial properties and eight village alleyways were sampled as part of the RI.

2.3.1 Groundwater and Hydrologic Conditions

The area encompassing the Site lies within the Upper Alluvial Valley of the Mississippi River floodplain. The native unconsolidated deposits underlying the till consist of inter-fingering horizons of clays, silts, and fine sands until depths of approximately 70 feet below ground surface (bgs) where the deposits become fine sand grading with depth to medium to coarse sand with sand and gravel horizons. The upper 50 feet beneath the Facility Area is associated with the Cahokia Alluvium.

Groundwater is encountered in the shallow Cahokia Alluvium, the deeper and more extensive Henry Formation Outwash, and the underlying bedrock. Based on limited yield and abundance of fines, the shallow Cahokia Alluvium deposits are not used for potable purposes in the Site area as determined by well survey results. The major aquifers in the area are the Henry Formation Outwash and gravel outwash aquifers encountered between 75 and 90 feet bgs, and the Valmeyer bedrock formation encountered at depths greater than 120 feet in the Site vicinity. The uppermost shallow saturated horizon was encountered between 15 feet and 18 feet bgs within a silty sand horizon or fine well-sorted sand with some silt horizon. Based on the Facility Area borings advanced during the RI, groundwater is initially encountered between 13 feet and 20.5 feet bgs in thin horizons of silt, sandy silt, silty sand, sand and clayey sand deposits associated with the Cahokia Alluvium. These inter-fingering silty to fine sand, silt, and clay layers extend to a depth of 74 feet where the deep borings terminated. Based on area well logs, the upper 75 feet of unconsolidated deposits have not been used for potable purposes within a one-mile radius of the Facility Area.

The shallow aquifer is from 13 to 75 feet bgs, and within that interval are 2 different horizons. Based on the low hydraulic conductivities measured through slug testing, and the abundant fines observed in the majority of the shallow wells, the saturated horizons between 0 to 30 feet bgs (except around the middle of the western Facility Area boundary near vertical profile well VP-02, where it is from 0 to 25 feet bgs due to fewer fines) are considered to be non-potable groundwater (Illinois Class II groundwater), as determined by IEPA. Shallow groundwater deeper than 30 feet bgs is considered potable water (Illinois Class I groundwater). These classifications are site-specific due to the conditions at the Site. The State of Illinois has a Comprehensive State Groundwater Protection Program (CSGWPP) where the State can define a specific groundwater aquifer as non-potable and not a true drinking water

aquifer. The IEPA site-specific determination for the OAZ Site can be found in the Administrative Record file. The measured groundwater flow within the shallow saturated horizon is west-northwesterly.

Though no slug testing or pump testing was performed on the underlying saturated horizons encountered at varying depths between 30 and 74 feet, the abundant fines and limited groundwater yield observed during vertical groundwater sampling combined with information from historic area well logs indicate the saturated horizons above 70 feet have not, and probably cannot, be used for potable purposes within a one-mile radius of the Facility Area due to low yield and turbidity. Historic well logs mapped within a one-mile radius of the Facility Area as part of the well survey detailed in the RI, show that potable private or industrial wells extend to, and draw from, the deeper sand and gravel aquifer encountered at approximately 90 feet bgs. The Facility Area and the surrounding Village of Fairmont are all currently served by a public water supply drawing from the Mississippi River.

Surface water runoff from the Facility Area is transported through a series of drainage ditches and Rose Creek, and ultimately flows to the Old Cahokia Watershed. Discharge to the watershed is made at two distinct points, referenced as the West Ditch Outfall and the Rose Creek Outfall. The Facility Area is drained by a set of four drainage ditches, two located in the eastern portion of the Facility Area designated as East Ditch 1 and East Ditch 2, and two located in the western portion of the Facility Area designated as West Ditch 1 and West Ditch 2. The locations of these drainage ditches are illustrated in Figure 1. The Facility Area ditches and Rose Creek are all ephemeral in nature; therefore, flow only occurs in direct response to precipitation events. The man-made ditches and Rose Creek are predominantly dry, with shallow, localized, intermittent pools of slow to stagnant water which contain flowing water only after storm events. The man-made ditches and Rose Creek do not receive base flow from the underlying shallow aquifer (i.e., there is no connection between the surface of shallow groundwater and surface water).

The Old Cahokia Watershed is a 1,300-acre area consisting of a complex of wetlands and stagnant, standing water, man-made ponds, and isolated upland areas located between Collinsville Road to the south, Illinois Highway 111 to the east, Interstate 55/70 to the north, and Illinois Highway 203 to the west. The Old Cahokia Watershed is a regional drainage feature that has been determined by IEPA to be impaired for aquatic life due to multiple point and nonpoint pollution discharge sources including agriculture, crop-related sources, non-irrigated crop production, construction, land development, urban runoff/storm sewers, hydromodification, and channelization.

2.3.2 Extent of Contamination

The RI identified COCs that pose potential risks to human health and/or the environment including arsenic, cadmium, lead, and zinc. The significant findings and conclusions from the site characterization activities completed during the RI are summarized below. Additional detail about Site characteristics is provided in the Final RI Report.

Source Materials

The RI determined that the primary source of metals concentrations at the Site at levels in excess of the screening levels is slag which is present on the Facility Area both in localized stockpiles of vitrified slag material and as ground, granular slag material redistributed across the Facility Area as structural fill. Granular, loose slag was also identified beneath compacted gravel in alleyways, and in surrounding residential, commercial and vacant properties in the village adjacent to the Site.

At present, the ground redistributed slag covers approximately 90 acres of the Facility Area, ranging in thickness from 6 inches to more than 9 feet, with an average depth of 3.5 feet and an approximate volume of 893,600 cubic yards (CY). The lateral extent of source material is shown on Figure 2. In the low-lying, unvegetated area in the northern portion of the Facility Area, the fill material consists of a dry, grey to black talc-like powder that reaches a thickness of 6 inches. In some areas the surficial fill horizon includes demolition-type materials (i.e. bricks, gravel, concrete, wood, etc.) from the burial of demolition debris from the former smelter structures. The remaining volume of the surficial stockpiled slag is approximately 43,560 CY and encompasses approximately 4.3 acres and is outlined in Figure 2.

As part of the RI, seven trenches were excavated to depths of 4 to 6 feet bgs across the footprints of former smelter structures to identify the nature and extent of material within the foundation/basement areas of the former structures. The majority of materials encountered in the trenches consisted primarily of slag fill, with buried demolition debris mixed with or under the granular fill. The demolition debris consisted of bricks and concrete, with some sheet metal, wood, glass and occasional non-slag waste materials. The non-slag waste materials included small localized instances of tar-like materials assumed to be residual products historically used at the Facility Area, including asphaltic tars or asphaltic grouts used in brick structures exposed to high heat. The tarry materials were found in two of the seven trenches (Trenches 1 and 7). The locations of the trenches excavated during the RI are shown on Figure 4.

Soils

Soil samples were collected within the Facility Area and the surrounding residential, commercial/industrial and vacant properties as part of the RI to determine if metals from source materials had migrated to underlying or surrounding area soils. Soil samples from residential, vacant, and commercial/industrial properties with concentrations of metals exceeding the screening criteria were typically found in areas where slag-like granular fill material had been deposited on the properties as fill or surfacing. The remaining elevated metal concentrations were believed to be associated with observed chipped paint, or abundant debris observed in some vacant properties located within Washington Park, as detailed in the TCRA and RI Reports.

Subsurface soils in the Facility Area underlying the slag source material contained metal concentrations generally an order of magnitude or more below the metal concentrations detected in the overlying slag source material, with concentrations typically dropping below the industrial screening criteria at a depth of less than 12 inches below the surface of the underlying soils.

The alleyway samples with exceedances of screening levels were typically found in slag/slag- like granular fill materials. The concentration of metals decreased rapidly in native soils below the identified slag fill.

During the RI, it was determined that exceedances were found to not be a result of airborne deposition, because no regular pattern of exceedances was found. The exceedances correlated to areas with slag fill. The areas downwind (east and south) of the Site were sampled during the TCRA and RI and did not have elevated concentrations of COCs that would suggest significant air transport of COCs. Similarly, areas located west of the Facility Area showed no pattern to the properties with COCs in excess of screening levels and most exceedances were attributed to redistributed slag on the properties or associated alleyways.

Sediments

Sediment samples (to a maximum depth of 12 inches) were collected from the ephemeral drainage ditches and Rose Creek that drain the Facility Area, and drainage areas within the Old Cahokia Watershed that are hydraulically connected to the Facility Area. Samples were also collected from Schoenberger Creek which was determined in the RI not to be hydraulically connected to the Facility Area.

The overall trend observed in the RI showed the highest concentrations were found in Facility Area man-made ditches and in the segment of Rose Creek bordering and immediately downstream of the Facility Area, with metal concentrations decreasing with distance from the Facility Area. The vertical extent of metals over the screening values were limited by the thickness of sediments, which generally did not exceed 6 inches, since accumulations of sediments are limited by regular drying up and scouring during storm events.

Surface Water

As part of the RI, surface water samples were collected from the ephemeral ditches, Rose Creek, Schoenberger Creek and the Old Cahokia Watershed where water was present. While metals were found above screening levels within the ephemeral ditches, Rose Creek and the Old Cahokia Watershed, metals were also found above screening values in upgradient reference locations and in upgradient areas within the Old Cahokia Watershed and Schoenberger Creek that are not hydraulically connected to the Facility Area.

Groundwater

As part of the RI, groundwater sampling within the top 30 feet bgs (considered non-potable groundwater) was conducted at shallow monitoring wells and piezometers located on the Facility Area. In addition, deeper groundwater samples from 30 to 74 feet bgs (considered potable groundwater) were collected using vertical profile sampling to determine if metals from the source materials had migrated to the Class I groundwater beneath the Facility Area. The location of these wells, piezometers and other groundwater sampling locations are shown on Figure 3.

In the upper 30 feet bgs, total and dissolved zinc, manganese and cadmium were the only metals found above the Class II standards. Exceedances of the Class II standards were found in one upgradient and one interior well and three piezometers, with the highest concentrations found in an interior well and two interior piezometers. None of the downgradient wells had an exceedance of the Class II standards.

Sampling of groundwater from 30 feet to 74 feet bgs showed total and dissolved cadmium and zinc above Class I drinking water criteria in four locations (one upgradient and three downgradient wells, all within the Facility Area) with the highest concentrations (0.097 milligrams per liter [mg/L] for cadmium and 7.3 mg/L for zinc) found between 30 to 40 feet bgs. Metal concentrations above Class I criteria were limited to saturated horizons within the upper 54 feet bgs. No Class I exceedances

were found in any of the samples collected from the 60 to 64 foot bgs interval or the 70 to 74 foot bgs interval.

The highest concentration of metals are found in the non-potable portion (0 to 30 feet) of the shallow groundwater in interior wells which suggests that some vertical migration of metals from source materials to groundwater is occurring in this portion of the Facility Area. However, once in groundwater the increase in measured pH levels and subsurface geology has limited the lateral migration of these metals, with levels dropping significantly in monitoring wells along the Facility Area's down-gradient western perimeter to levels at or below those detected in up-gradient on-Site monitoring wells along the east boundary.

The two-dimensional fate and transport model, detailed in Appendix 0 of the Final RI Report was used to predict the distance at which concentrations of cadmium or arsenic would fall below the Illinois Class I standards west of the Facility Area property line. The modeled results showed that arsenic and cadmium concentrations would fall below Illinois Class I standards within 50 to 250 feet down-gradient of the Facility Area property line.

Although an official background study for groundwater has not been conducted, various data from up-gradient of the Site indicates that shallow groundwater may be impacted by cadmium, manganese and arsenic from up-gradient sources unrelated to the OAZ Site.

2.4 Feasibility Study

Following completion of the RI, an FS for the Site was conducted. The results of the FS are documented in the February 6, 2012 Feasibility Study Document (Rev. 3). The FS was based on the findings of the previously completed RI and risk assessments.

2.4.1 Remedial Action Objectives

The following Remedial Action Objectives (RAOs) were identified based on the summary of receptor risks and hazards for the exposure scenarios presented in the Baseline Human Health Risk Assessment (BHHRA):

Source Materials

- Prevent direct contact with, or ingestion and inhalation of, COCs in source materials that could result in unacceptable human health risks as defined in the BHHRA;
- Minimize the transport of COCs from source materials via the physical redistribution of slag, storm water run-off over exposed slag to drainage ditches and creeks that drain the Facility Area, and lateral migration in shallow groundwater that could result in additional affected media or recontamination of remediated areas;
- Remediate the Site to where source materials are no longer contributing to groundwater contamination;
- Eliminate the discharge of storm water containing metals at concentrations exceeding the Illinois Water Quality Standards from the Facility Area to the manmade ditches and Rose Creek; and
- Eliminate the transport of COPECs from surficial source material deposits to the inundated wetland or perennial open water area of the Old Cahokia Creek Watershed.

Affected Soil/Sediment

- Prevent direct human contact with, or ingestion and inhalation of, COCs in affected soils/sediment that could result in an unacceptable human health risk as determined in the BHHRA;
- Minimize the transport of COCs in affected soils/sediments via the physical redistribution of slag, storm water run-off over exposed slag to drainage ditches and creeks that drain the Facility Area, and lateral migration in shallow groundwater that could result in additional affected media or recontamination of remediated areas;
- Minimize the potential of exposure by construction workers conducting intrusive activities to the discarded tarry material found with buried demolition debris that could result in an unacceptable human health risk as determined in the BHHRA;
- Prevent direct contact with, or ingestion or inhalation of, COCs in affected soils at residential, commercial and vacant properties by current residential or potential future residential receptors that could result in an unacceptable human health risk as determined in the BHHRA;
- Prevent direct contact with, or ingestion or inhalation of, COCs in affected soils and source materials in alleyways by commercial or utility workers as determined in the BHHRA; and
- Remediate the Site to where it is no longer contributing to groundwater contamination.

Affected Groundwater

- Prevent further migration of the shallow groundwater contamination; and
- Prevent the ingestion of shallow affected groundwater that could pose an unacceptable risk to human health.

2.4.2 Remedial Alternative

The following is a summary of Alternative 4A, which is the remedial alternative selected by USEPA in the ROD.

- Excavation of vitrified slag, redistributed ground slag, and affected soils and sediments inside the Facility Area, then consolidation into a 35-acre consolidation area on the Facility Area.
- Removal of affected soils and sediments outside the Facility Area to be managed with consolidated media inside the 35-acre consolidation area.
- Capping the consolidated affected media with a 24-inch, low-permeability, compacted soil barrier layer with a hydraulic conductivity no greater than $1x10^{-7}$ cm/sec and a 12-inch vegetated layer cover system.
- Institutional Controls (ICs) in accordance with the Illinois Uniform Environmental Covenants Act to achieve the following: **1)** prohibit future residential land use on the 35-acre consolidation area and select off-site properties that are not likely to be used for future residential development; 2) control access to engineered components of the remedy and prohibit intrusive activities in capped areas to maintain the effectiveness of the cap; and 3) prohibit the installation of potable wells and use of shallow groundwater within the affected groundwater plume until all groundwater cleanup standards have been achieved to ensure long-term protection of human health.
- Drainage controls on manmade ditches draining the Facility Area.
- Stormwater and groundwater monitoring.
- Implementation of long-term operation and maintenance (O&M) activities to maintain the integrity of the cover system and other components of the remedy.
- A groundwater management zone will be established pursuant to regulations in the Illinois Administrative Code related to Groundwater Quality (35 IAC, Subtitle F, Chapter I, Part 620).

3. Remedial Design Components

The RD will be prepared to guide implementation of the selected remedial approach (Alternative 4A) and support attainment of remedial objectives and future reuse of the Site property. The RD will include Pre-Design Investigation, design of the Facility Area excavation, design and planning for the excavation of off-Facility Area soils above the established Risk-Based Cleanup Levels (CLs) (Table 1), design of the on-Site soil repository, final Site grading, the development of institutional land use, ground water and surface water controls, and the development of the required environmental monitoring plan and Operation and Maintenance (O&M) plans for the repository cap. These elements are discussed in detail below.

3.1 Pre-Design Investigation

As set forth in the SOW, a Pre-Design Investigation (PDI) will be conducted to collect information necessary for completion of the RD/RA. The primary objectives of the Pre-Design Investigation include:

- Collection of groundwater samples and perform water level measurements from all Site monitoring wells, including the three additional delineation wells installed as part of the PDI to define the down-gradient extent of contamination. All Site monitoring wells will be developed or redeveloped prior to sampling. Collected groundwater samples will be submitted for laboratory analysis of arsenic, lead, cadmium, zinc and manganese;
- Soil sampling of the 29 residential, commercial/industrial or vacant properties, including those sampled as part of the TCRA or RI for which there is currently insufficient data to determine if remedial action is required and properties where access was previously denied during the TCRA and RI. This will further delineate the extent and quantity of required off-Facility Area remediation. The quantity of material to be placed in the consolidation area will have a direct effect on the design of the consolidation area. Material excavated from off-Facility Area properties that are below industrial CLs may be considered for use in the vegetative layer of the consolidation area cap;
- Trenching to identify and locate the extent of existing void spaces (utility trenches and basements) within the proposed consolidation area and to provide additional data for estimating the nature, extent and quantity of buried materials to be disposed. If voids are identified within the Consolidation Area, procedures and specifications for filling of the voids will be developed during the RD. Data obtained regarding the nature and extent of material to be disposed will be utilized in developing soil balance calculations and in developing the final grades for the Consolidation Area;

- Test pits to facilitate the collection and analysis of samples to characterize previously encountered buried tarry waste material;
- Collection and analysis of non-impacted Site soils and stockpiled soils from previous TCRA to evaluate if the concentrations of metals in these soils are below the industrial CLs and if these soils could be used in the cap on the Consolidation Area.
- Collection of geotechnical samples from below the Excavation Area (the part of the Facility Area not within the Consolidation Area) and the Consolidation Area to pre-screen these soils for possible use in capping of the Consolidation Area. The types of geotechnical tests to be performed will depend on the anticipated use of the soil (barrier layer or vegetative layer) based on a visual examination of the samples during the PDI. Additional testing will be performed to evaluate these soils for use in capping of the Consolidation Area, most likely in the vegetative layer. The results of these tests will be used in conjunction with site topography, previously estimated depth of excavation (identified in the RI/FS), and the estimated quantities of sediments and soils from Off-Facility Area properties to develop an overall soil balance evaluation of the site during the RD phase.

3.1.1 Groundwater

Three groundwater monitoring wells will be installed, developed and sampled down-gradient from the Site in order to define the down-gradient extent of the Site-related exceedances of the applicable federal and state standards for arsenic, lead, cadmium, zinc and manganese. Additionally, the previously installed monitoring wells will be redeveloped and sampled. These samples will be analyzed for the same metals. The anticipated locations of the proposed three additional groundwater monitoring wells are shown on Figure 3). Detailed procedures involved with the installation and development of the wells and the sampling and analysis of the groundwater are presented in the Field Sampling Plan (FSP) presented in Appendix A, and the Quality Assurance Project Plan (QAPP) presented in Appendix B.

3.1.2 Off-Facility Area Properties

Soil samples will be collected and analyzed from the 29 residential, commercial/industrial or vacant properties shown on Figure 5 where access is obtained. These properties include those previously sampled as part of the TCRA or RI for which there is insufficient data to determine if remedial action is required, as well as properties where access was previously denied during the TCRA and RI. Details of the sampling procedures and analyses are presented in the FSP and QAPP.

3.1.3 On-Site Trenching and Test Pits

The primary remedial action for this Site is the excavation and consolidation of source material, impacted soils and sediment, and construction debris into a 35-acre consolidation area. The RA also includes classification and disposal of the buried tarry material discovered during the RI. To complete the RD it is necessary to obtain additional data on the characteristics of the tarry material, other materials buried in the Facility Area foundations, the presence of voids in the foot print of the Consolidation, Area, and the geotechnical properties of any potential borrow soils located on the Facility Area. The majority of this information will be obtained via the excavation of trenches and test pits and associated sampling and analysis. These activities include:

- Consolidation Area – Approximately nine trenches will be excavated within the proposed Consolidation Area to identify and delineate the extent of possible subsurface voids, primarily in the form of intact utility ducts, chambers or unfilled foundations. The RD will include measures to ensure these voids are properly filled prior to the above-ground placement of material in the Consolidation Area. Approximate anticipated locations of the trenches are shown on Figure 4. The actual locations may be adjusted in the field based on observations during the PDI. In addition, two test pits will be excavated through the source and/or impacted soils into the underlying clean soils to determine if soils are below CLs. Samples of the clean soils will be subjected to appropriate geotechnical testing to evaluate its potential use in the Consolidation Area Cap.
- Facility Excavation Area – Approximately five additional trenches will be excavated in the portion of the Facility Area where source material and affected media will be excavated as part of the RA. The primary purpose of the trenches is to more precisely delineate the horizontal and vertical extent of demolition debris and other materials located within former building foundations. In addition, three test pits will be excavated in the Excavation Area to facilitate the collection of samples of underlying “clean” soils for possible geotechnical and agronomic testing. This data will be used in evaluating the soils for use in the low-permeability layer of the repository cap and vegetative layer as well as to evaluate methods to establish vegetation after final site grading.
- Existing Soil Stockpiles – Two to three test pits will be excavated into the soil previously stockpiled on the Facility Area during the TCRA. These samples will be tested to determine if these soils are below industrial CLs. If so, they will also be subjected to additional testing. The specific testing will depend on its anticipated use in the Consolidation Area Cap. This will be based on a visual inspection of the soils in the stockpile.
- Tarry Material – Approximately two test pits will be excavated at the approximate locations of Trenches 1 and 7 shown on Figure 4. The purpose of these trenches is to collect samples of the buried tarry material discovered as

part of the RI. The samples will be collected in accordance with the FSP presented in Appendix A and submitted to the laboratory for TCLP waste characterization analysis. The proposed analytes are presented in the FSP. The results of these analyses will be utilized to classify the waste and determine appropriate disposal.

The trenching and test pit excavations described above will be performed using a backhoe or excavator. The trenches are expected to be approximately 3 feet wide, 6 to 8 feet deep and 10 to 50 feet in length. Actual dimensions will vary based on conditions and materials encountered. Excavated material will be temporarily stockpiled adjacent to the trenches. Upon completion of each trench, and at the end of each work day, the excavated material will be placed back into the excavation and compacted with the equipment's wheels, track, or bucket. An experienced engineer, geologist or geotechnical technician will observe, describe and document each excavation and collect samples as directed by the Design Engineer. At no time will a human be allowed to enter an open trench greater than 2 feet deep.

Upon completion of the PDI, a PDI report will be prepared as described in Section 4.1.

3.2 Remedial Design

After the completion of the PDI, a RD will be prepared in accordance with the SOW for all components of the RA.

3.2.1 Description and Objectives

The Remedial Action selected for the Site involves excavation, consolidation and capping of source materials, impacted soils and sediment, and on-Site construction and demolition debris in a manner that meets all of the RAOs and consolidates and caps all materials that have concentrations of COCs above the defined CLs. The RAOs and CLs are presented in Section 2.4.1.

3.2.2 Performance Standards

The RA performance standards of the soil excavation is the removal and consolidation of source materials and affected soils exceeding the residential human health CLs, the removal and consolidation of sediments within the drainage ditches and Rose Creek exceeding applicable human health and ecological CLs, and the prevention of future off-Site migration of COCs (including metal-laden sediments). The consolidation area cover system was selected to prevent human contact with the consolidated material

and to minimize storm water infiltration through the cap and underlying consolidated material into the underlying groundwater.

3.2.3 Design Considerations

The design and implementation of the RA will be based on the following:

- The horizontal and vertical extent of source material, affected soils and sediments, and construction debris, as identified by the RI and PDI;
- Final grades of the Consolidation Area will be designed to accommodate the anticipated volume of material to be excavated from the Site, and will be designed for ease of maintenance, minimization of erosion and for the control and management of storm water runoff;
- The final cover system for the Consolidation Area will be designed with a low-permeability barrier layer to minimize infiltration and a vegetative cover layer to support a good stand of vegetation;
- Soils less than CLs will be evaluated for possible capping material and/or final grading of the excavated portions of the Facility Area based on their properties and the overall Site soil balance;
- The overall Site soil balance will be evaluated to estimate the required quantity and types of off-Site borrow that may be required to complete the capping of the Consolidation Area and/or the final regrading of the excavated portions of the Facility Area. Based on a review of Site topography and proposed excavation depths presented in the RI/FS, it is unlikely that enough borrow soil will be available from the excavated portions of the Facility Area. Therefore, Facility Area soils that may be considered for use as borrow soils include the soil previously stockpiled on the Facility Area as well as soils underlying the Consolidation Area. The use of soils underlying the Consolidation Area would require that the existing source material and impacted soils be excavated from a portion of the Consolidation Area and placed in an adjacent portion of the Consolidation Area. Confirmation sampling would be performed to ensure that the remaining soils are below industrial CLs. These soils could then be excavated (to a depth of 5 to 6 feet below original ground surface) and stockpiled for use in capping and/or regrading. This option would be evaluated against importing soils from off-Site.
- The final RD will include regrading of the excavated areas on the Facility Area for positive drainage and the re-establishment of vegetation. Depending on post-excavation grades and the Site soil balance, some off-site borrow may be required to achieve final grades that provide positive drainage from the Facility Area;
- Backfilling and restoration of the residential and commercial properties to their pre-RA grades and condition;

The details of the RA Monitoring Program will be developed during the Remedial Design. The proposed Remedial Action Monitoring Program will be presented in the Performance Standard Verification Plan, which will be submitted as part of the Intermediate Design Report, and the Operation and Maintenance (O&M) Plan, which will be submitted with the Pre-Final Design Report.

3.3 Institutional Controls

The RA will incorporate institutional controls to: prevent future use of ground water and to prevent disturbance of the consolidation area cap.; restrict future land use of the consolidation area to industrial and/or commercial uses. A plan for implementing the institutional controls will be prepared and submitted as described in Section 4 of this Work Plan.

4. Remedial Design Deliverables

In addition to this RD Work Plan, the following deliverables will be prepared for submittal to USEPA as part of the RD, as outlined in the SOW:

- Pre-Design Investigation Report (PDIR)
- Preliminary Design
- Final Design

Supporting Documents will include:

- RA Health and Safety Plan;
- RA Quality Assurance Project Plan;
- RA Field Sampling Plan;
- Performance Standard Verification Plan;
- Construction Quality Assurance Plan;
- Institutional Controls Implementation Plan;
- Operation and Maintenance Plan.

The preliminary and final design documents will address all components of the remedy selected in the ROD. The design documents will present and describe each component of the remedy and provide appropriate plans, specifications, construction schedule, and other requirements of each phase of the RD, as discussed below. All plans and specifications will be developed in accordance with the USEPA Superfund

Remedial Design and Remedial Action Guidance (OSWER Directive No. 9355.0-4A) and shall demonstrate that the RA shall meet all objectives of the ROD, the AOC, and this SOW including all performance standards. The anticipated scope of these deliverables and the context of each deliverable within the overall RD are discussed in the sections below. The timing of each submittal is shown on the RD schedule presented in Section 6, and as described in the following sections.

4.1 Pre-Design Investigation Report

The results of the PDI will be presented in a PDIR submitted within 90 days after completion of the last analytical sample collected during the PDI. The PDIR will include the results of the sampling, monitoring, and trenching investigations completed as part of the PDI.

4.2 Preliminary Design

The Preliminary Design Report (PDR) will be submitted to USEPA and IEPA when the RD is at approximately 30% complete. The PDR will include the following elements, as specified in the SOW:

- Results of any completed pre-design investigation and/or additional field sampling and analysis;
- Preliminary design of the consolidation area including: location and configuration of the consolidation area, required site preparation activities, design assumptions, parameters and supporting design calculations;
- Preliminary design for ditches and drainages to be remediated as part of the remedial action;
- Preliminary post-remedial topography and drainage plan for the remediated areas of the Facility Area;
- Description of the RA approach to address identified off-Facility Area properties;
- Any other relevant preliminary plans, drawings, sketches, and design calculations not listed specifically above, but required for this project;
- Volume of material by type to be excavated and transported to the consolidation area;
- Volume of material to be transported to off-Site disposal facilities;
- Volume and specifications of required borrow materials;
- Easements and substantive permit equivalency (or permit) requirements; and

- Preliminary construction schedule, including the selection of the remedial action contractor;
- A discussion of how the RD complies with each ARAR.

4.3 Final Design

A draft Final Design Document will be prepared and submitted to USEPA and IEPA when the design is 100 percent complete and in accordance with the schedule contained Section 6 of this RD Work Plan. The draft Final Design Document will address all comments and recommendations received on the Preliminary Design Document and shall provide more detailed information on the elements listed for inclusion in the Preliminary Design Document. The draft Final Design Document will also provide an outline for the RA Work Plan and the RA supporting documents including, but not limited to: Health and Safety Plan, Quality Assurance Project Plan, Field Sampling Plan, Performance Standard Verification Plan, Construction Quality Assurance Plan, Institutional Controls Implementation and Assurance Plan, and Operation and Maintenance Plan as described in the SOW.

5. Project Management and Administration Plan

A project management organization chart is presented in Figure 7, which identifies the key members of the project team and their respective roles. ARCADIS has been retained as the supervising contractor by Blue Tee to perform the remedial design activities.

USEPA Region 5 Remedial Project Manager, Sheila Desai

The USEPA Remedial Project Manager has the overall responsibility for all phases of the RD.

CH2M Hill Project Manager, Rachel Grand

The CH2M Hill Project Manager (PM) is responsible for the oversight of Site activities on behalf of the USEPA and ensuring that all work is conducted in accordance with the approved FSP and QAPP.

Gold Fields Project Manager, Dianna Tickner

Project Coordinator, Gary Uphoff, Environmental Management Services Company

The primary responsibility of the Project Coordinator (PC) will be to ensure proper coordination and communication among the various project stakeholders. These stakeholders include the USEPA, the IEPA, the Respondents, ARCADIS and ENTACT. The PC will be responsible for administration of all the Respondents actions required by the AOC. To the greatest extent possible, the PC will be readily available during Site work.

ARCADIS TEAM

Management of the RD within ARCADIS will be conducted from the Cincinnati, Ohio office. Key staff that will be involved in the RD are identified below, along with a summary of the anticipated role of each staff member.

ARCADIS Project Manager, Richard J. Kenter, CPG

The ARCADIS PM will be responsible for monitoring the work progress and schedule, coordinating with surrounding municipal and private property owners, and working with the Technical Project Manager in ensuring that the appropriate resources are available to effectively conduct the work.

ARCADIS Technical Project Manager - Charles McCulloch, CPG, REM

The ARCADIS Technical Project Manager (TPM) has overall responsibility for managing the technical aspects of the RD and seeing that the RD activities are completed in accordance with federal, state, and local regulations, and conducting the subsequent data review, evaluation and reporting. This includes safely and effectively completing each of the RD tasks to meet the project objectives required under the AOC, and to ensure all work is conducted in compliance with the QAPP and HASP and within the established project schedule and budget. The TPM will accomplish these objectives by monitoring the work progress, reviewing and planning each project task with technical staff and the Field Team Leader and ensuring that appropriate and sufficient resources are available to the field sampling team.

The TPM will receive daily progress reports from field team on the status of planned, ongoing, and completed field activities, including QA/QC performance and health and safety issues. In addition, the TPM will be notified of any potential problems and aid in

determining the solutions and/or corrective action. Specific responsibilities of the TPM will include, but are not limited, to the following:

- Provide personnel and equipment for remedial investigation activities;
- Ensure the RD is completed within the approved schedule;
- Ensure effective communications between the PC and the USEPA RPM;
- Communicate any request for modifications to the approved FSP or QAPP to the PC and USEPA RPM; and,
- Promptly notify the PC and the USEPA RPM in the event unforeseen field conditions and/or problems are encountered.

ARCADIS Lead Design Engineer – John W. Holm, P.E.

The ARCADIS Lead Design Engineer (Engineer) is in responsible charge of all aspects of the engineering design of the project. The Engineer will work closely with the TPM and PM to ensure that the RD meets the stated goals, objectives, requirements and schedule, as well as the applicable state and federal regulations.

ARCADIS Quality Control Officer and Site Safety Officer – Joni Culpepper, PG

The ARCADIS Quality Control Officer (AQCO) will work with all members of the ARCADIS team to ensure that appropriate quality control procedures are followed, and that the work is completed in accordance with the FSP, QAPP and the QMP.

The ARCADIS Site Safety Officer (ASSO) will be present on-Site during all field operations and will be responsible for implementing the HASP. The ASSO has stop-work authorization which can be executed upon his/her determination of an imminent safety hazard, emergency condition, or other potentially dangerous situations such as detrimental weather conditions. Authorization to proceed with the work will be issued by the Corporate H&S Officer in conjunction with the TPM

ARCADIS Field Team Leader

The ARCADIS Field Team Leader (AFTL) will work with the TPM in overseeing the RD field activities and ensuring that the activities are implemented and completed in accordance with the FSP, QAPP and HASP. The AFTL will assign specific field duties to team members in conjunction with the TPM, will be responsible for the mobilization and demobilization of the field team, and will direct the activities of the project subcontractors on-Site. Any logistical problem hindering field activities, such as weather-related working conditions, will be relayed to, and solved by, the TPM.

ENTACT Field Team Leader

The ENTACT Field Team Leader (EFTL) will work with the TPM in overseeing the RD field activities and ensuring that the activities are implemented and completed in accordance with the FSP, QAPP and HASP. The EFTL will assign specific field duties to team members in conjunction with the TPM, will be responsible for the mobilization and demobilization of the field team, and will direct the activities of the project subcontractors on-Site. Any logistical problem hindering field activities, such as weather-related working conditions, will be relayed to, and solved by, the TPM.

6. Project Schedule

Section VI of the RD/RA Statement of Work established a preliminary schedule of events and reporting requirements for completion of the Remedial Design, as follows:

Submittal	Submittal Due Date
Draft Remedial Design Work Plan	60 days after the effective date of the AOC
Final Remedial Design Work Plan	30 days after receipt of USEPA's comments on the Draft Remedial Design Work Plan
PDI Report	90 days after the last set of analytical data is collected during the PDI
Preliminary Design Documents	In accordance with the schedule in the final RD Work Plan
Draft Final Design Documents	30 days after the receipt of USEPA's comments on the draft Final Design Documentation

Submittal	Submittal Due Date
Final Design Documents	30 days after receipt of USEPA's comments on the draft Final Design Documents
Progress Reports	Every 30th day after USEPA's approval of RD Work Plan unless otherwise directed in writing by USEPA Project Coordinator

A more detailed schedule is presented on Figure 6. The detailed schedule includes major milestones, meetings, and review time for USEPA and IEPA. In order to minimize the need for multiple reviews and comments, Blue Tee proposes meetings be held between USEPA and Blue Tee approximately one week after Blue Tee's receipt of comments on the PDI, 30% RD, and Draft Final RD. The purpose of these meetings is to discuss USEPA's comments to ensure the following submittals accurately address the comments. Any specified response period, shown in the preliminary schedule above, would then start after that meeting. It should be noted that the schedule presented on Figure 6 is preliminary, and may be adjusted during the implementation of the PDI and RD due to unforeseen events such as: weather or equipment delays during the PDI, additional investigation and/or sampling resulting from unanticipated conditions encountered during the PDI and the time required for agency review.

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Tables

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Table 1. Cleanup Levels, Old American Zinc Plant Site, Fairmont City, Illinois

Contaminant of Concern	Soil/Sediment		Groundwater	
	Residential (mg/kg)	Non-Residential (mg/kg)	MCL/ Illinois Class I (mg/L)	Illinois Class II (mg/L)
Arsenic	32	239	0.01	0.2
Cadmium	37	809	0.005	0.05
Lead	400	826	NA	NA
Zinc	6,400	31,852/ 306,600 a	5	10
Manganese	NA	NA	0.15	10

a. Based on Human Health Risk for Soil/Sediment

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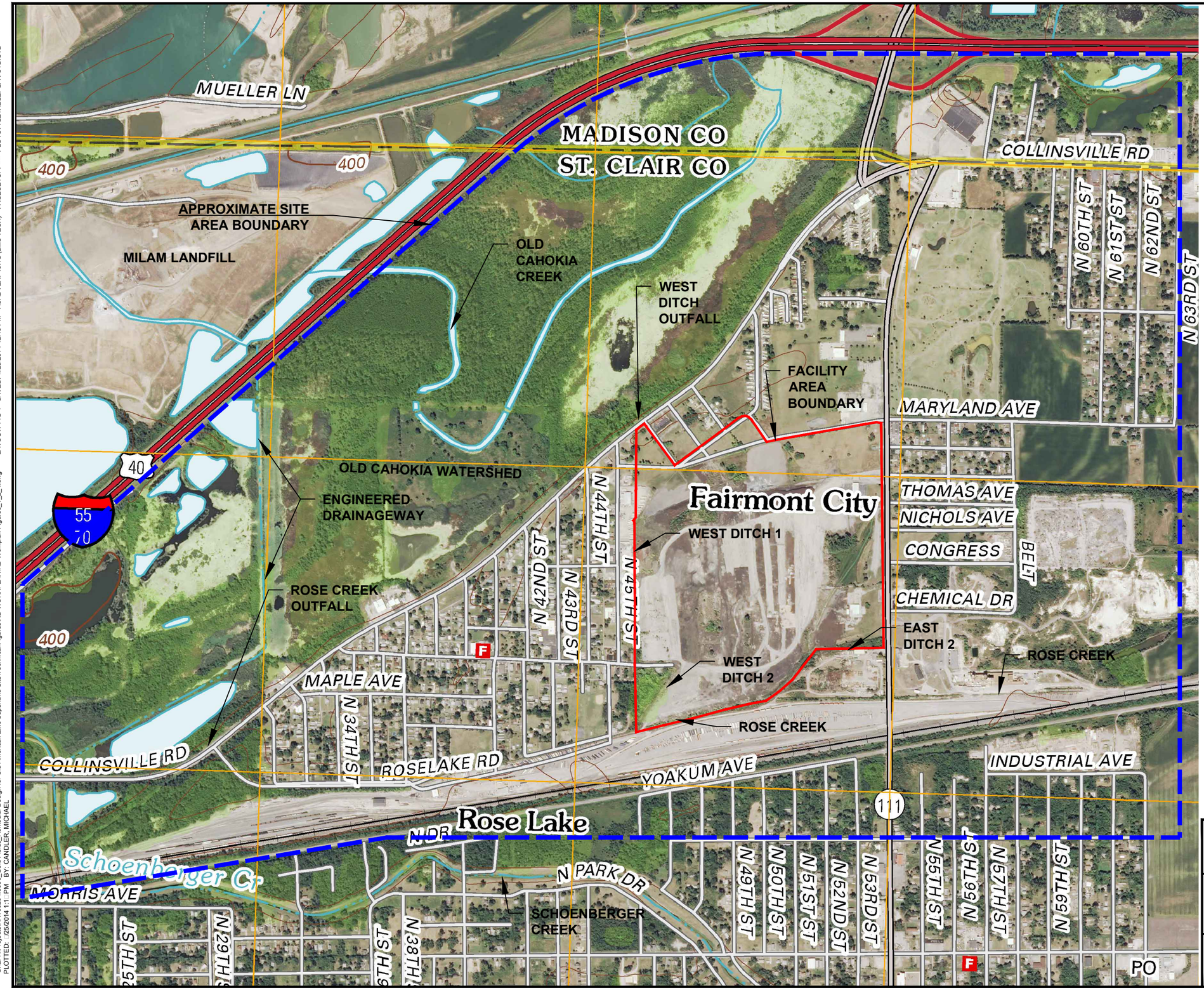
Figures



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LEGEND

- FACILITY AREA BOUNDARY
- APPROXIMATE SITE AREA BOUNDARY

NOTE:
FIGURE BASED ON INFORMATION INCLUDED IN RI/FS FIGURES BY ENTACT

BLUE TEE CORP.
OLD AMERICAN ZINC SITE
FAIRMONT CITY, ILLINOIS
RD WORK PLAN

SITE PLAN AND EXISTING CONDITIONS

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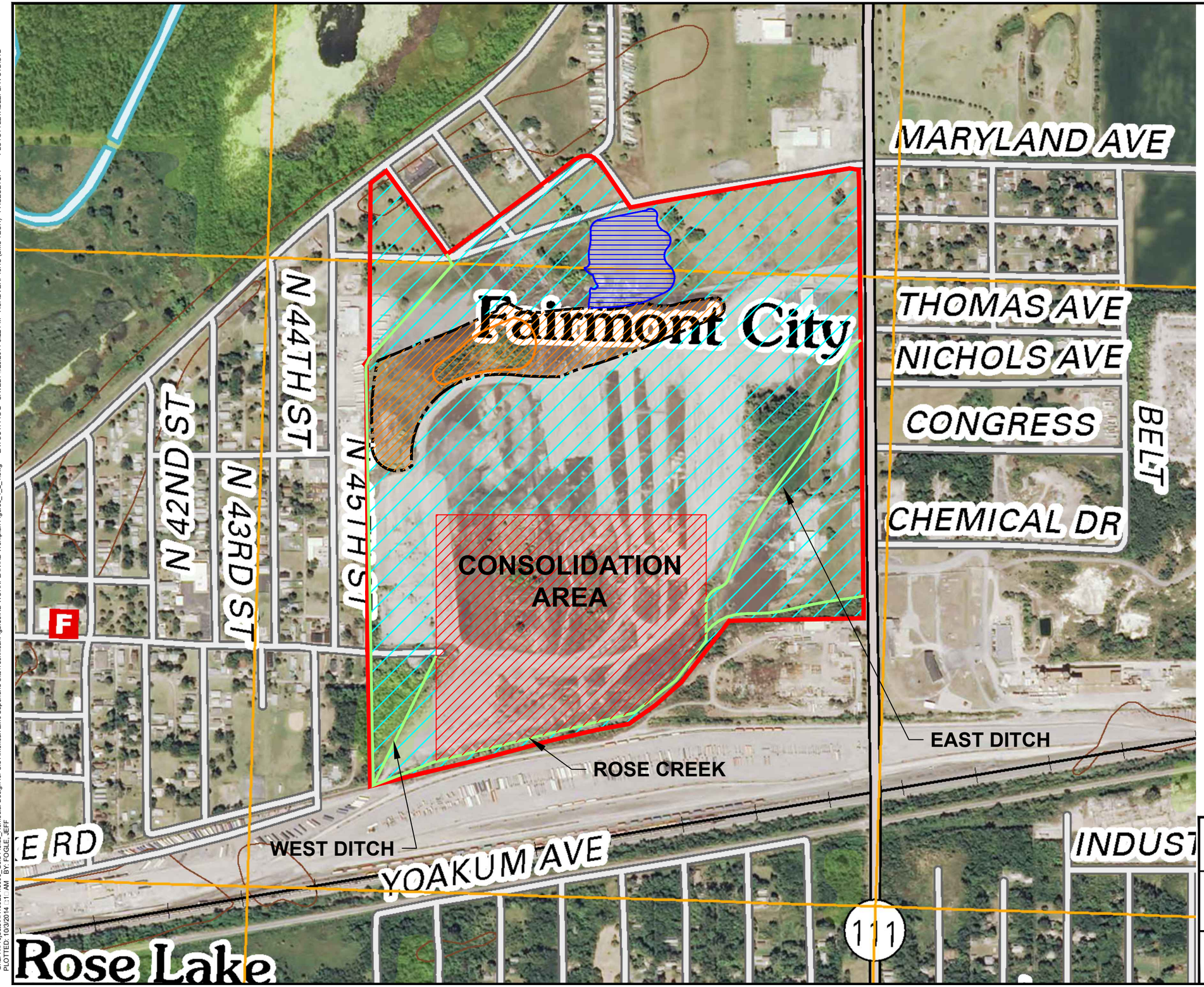
FIGURE 1



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LEGEND

- FACILITY AREA BOUNDARY
- CONSOLIDATION AREA
- AREAS W/REDISTRIBUTED SLAG
- EXISTING STOCKPILED SLAG BOUNDARY
- STOCKPILED SLAG
- EXCAVATION IN LOW–LYING AREA
- EXCAVATION IN EXISTING DITCHES
- SOIL STOCKPILE ON TOP OF SLAG

NOTE:
FIGURE BASED ON INFORMATION INCLUDED IN RI/FS FIGURES BY ENTACT

BLUE TEE CORP.
OLD AMERICAN ZINC SITE
FAIRMONT CITY, ILLINOIS
RD WORK PLAN

FACILITY AREA REMEDIATION PLAN

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FIGURE **2**

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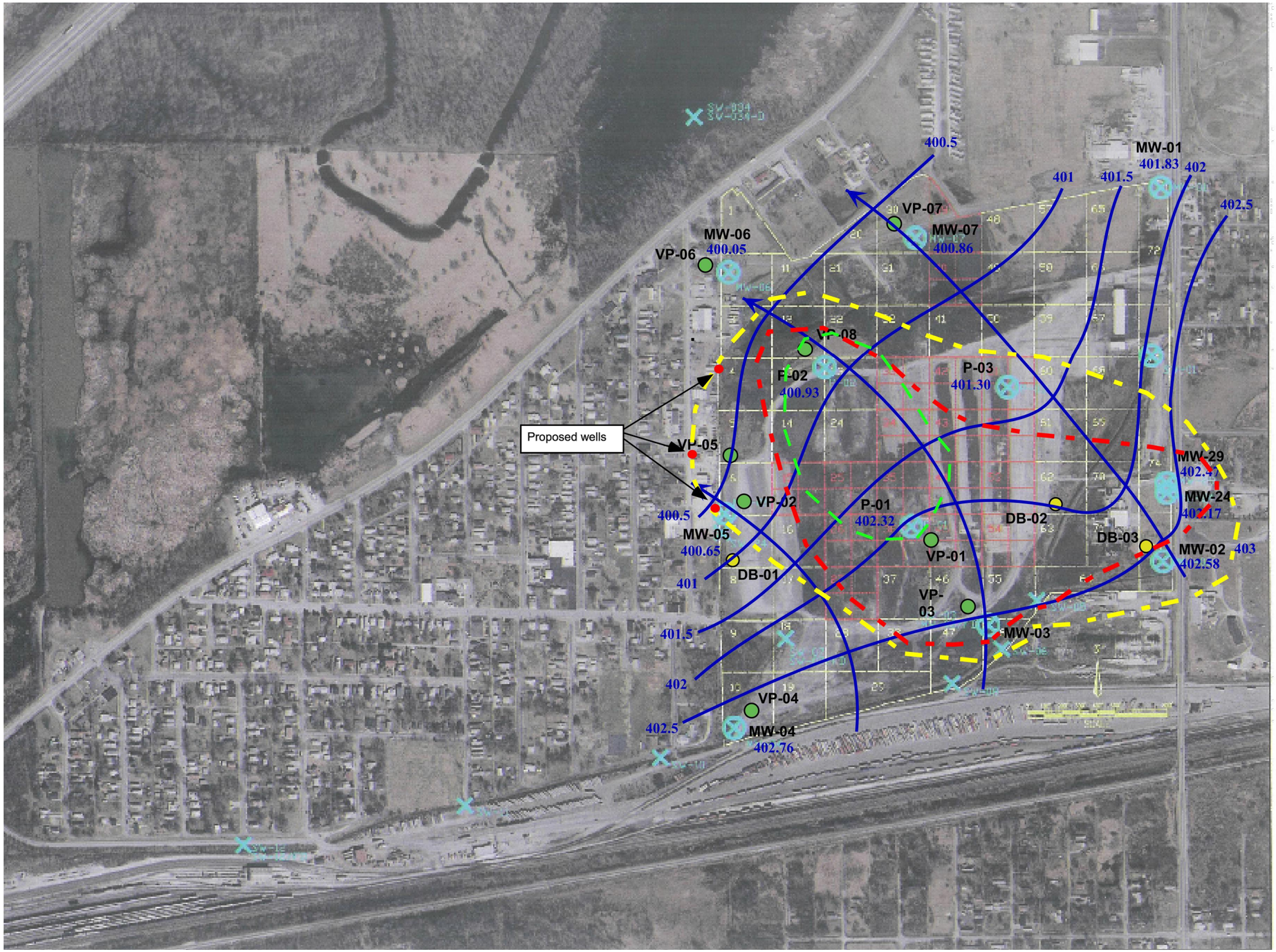

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NOTE:
FIGURE PREPARED BY ENTACT

LEGEND

- PROPOSED MONITORING WELLS
- EXISTING MONITORING WELLS AND PIEZOMETERS
- R1 SURFACE WATER SAMPLE LOCATION
- COC EXCEEDENCES OF CLASS II
- COC EXCEEDENCES OF CLASS I
- CADMIUM AND ZINC EXCEEDENCES OF GROUNDWATER PCGs

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FAIRMONT CITY, ILLINOIS
RD WORK PLAN

EXISTING AND PROPOSED GROUNDWATER MONITORING PLAN

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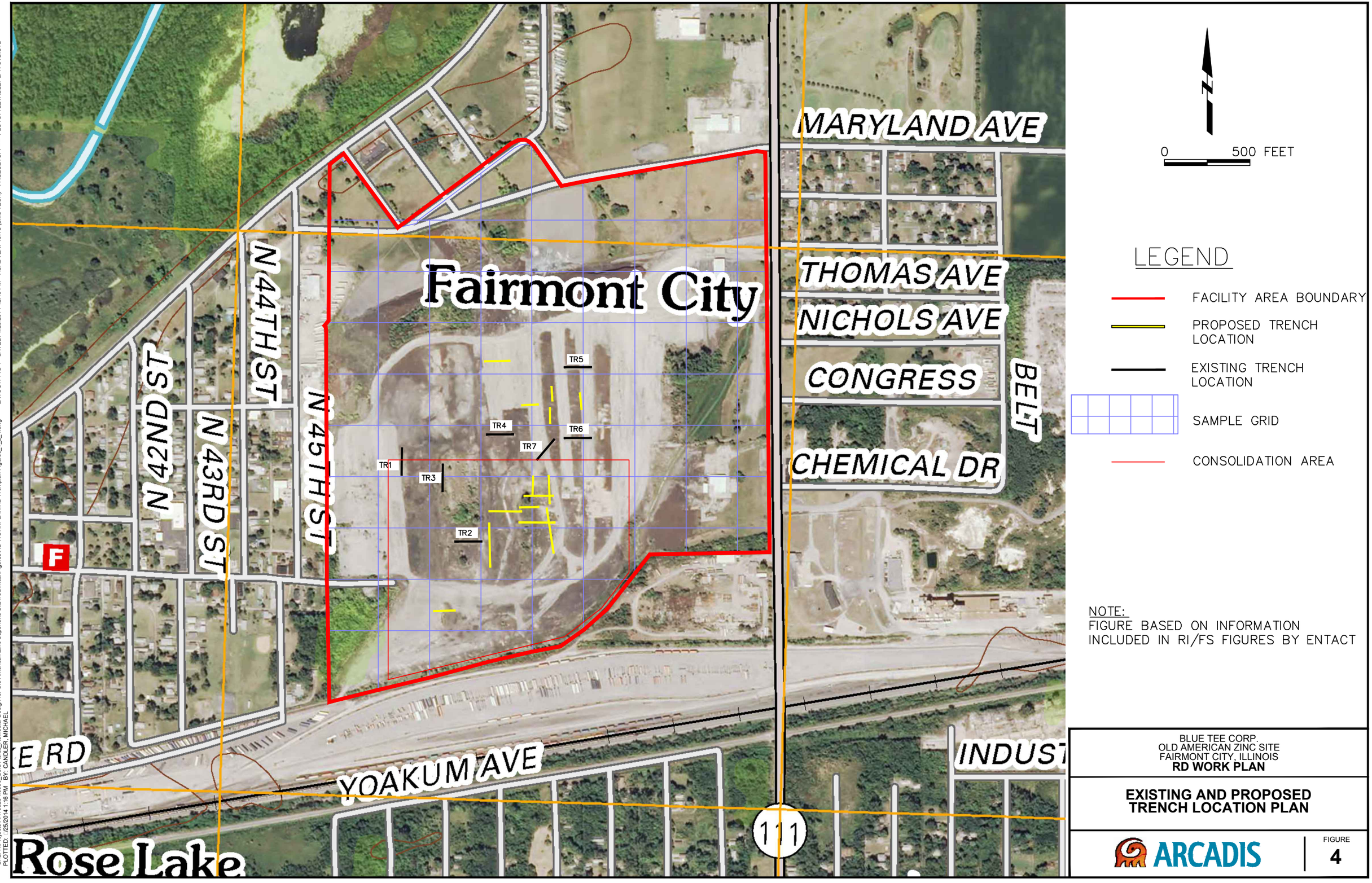
FIGURE
3



LEGEND

- FACILITY AREA BOUNDARY
- PROPOSED TRENCH LOCATION
- EXISTING TRENCH LOCATION
- SAMPLE GRID
- CONSOLIDATION AREA

NOTE:
FIGURE BASED ON INFORMATION INCLUDED IN RI/FS FIGURES BY ENTACT

BLUE TEE CORP.
OLD AMERICAN ZINC SITE
FAIRMONT CITY, ILLINOIS
RD WORK PLAN

EXISTING AND PROPOSED TRENCH LOCATION PLAN

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FIGURE
4

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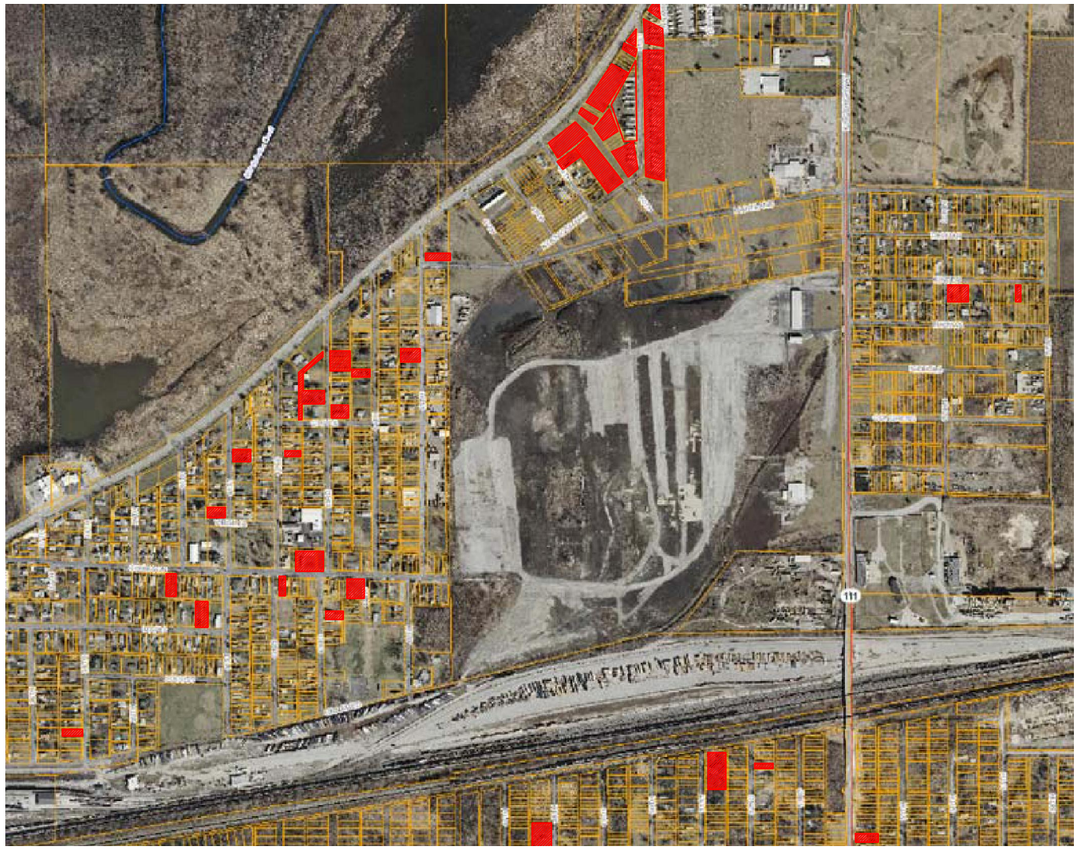

ENTACT ID	Property Class	Current Use	Owner Name Last	Owner Name Last	Action	Evaluation of 10-4 Risk of Arsenic, Cadmium, Zinc and Lead	Evaluation of 10-5 /10-6 for arsenic (Default to IL background value)
TCRA Properties to be further investigated as part of the RA							
004R	Residential	Residence	Keller Farms Inc.	2884	N. 45th St	To be re-sampled	Cadmium exceedence of PCG
019R	Residential	Residence	Skaggs (Bob Strackeljahn)	2344	N. 52nd St	To be re-sampled	Cadmium exceedence of PCG
020R	Residential	Residence	Bruce	2342	N. 51st St	To be re-sampled	Cadmium exceedence of PCG
045R	Residential	Residence	Morales	3012	N. 49th St	To be re-sampled	Cadmium exceedence of PCG
083R	Residential	Residence	Wallace	2304	N. 54th St	To be re-sampled	Cadmium exceedence of PCG
085R	Residential	Residence	Sirko	2825	N. 44th St	To be re-sampled	Cadmium exceedence of PCG
087R	Residential	Residence	Havahome, LLC		N. 51st St	To be re-sampled	Cadmium/lead exceedence of PCG
090R	Residential	Residence	Havahome, LLC		N. 51st St (Woodrow Av	To be re-sampled	Cadmium exceedence of PCG
094R	Residential	Residence	Hava-home LLC		51st St	To be re-sampled	Cadmium exceedence of PCG
103R	Residential	Residence	Huskamp	4303	Chiles St	To be re-	Cadmium exceedence of PCG
132R	Residential	Residence	Bregen	4308	Cookson Rd	To be re-sampled	Cadmium exceedence of PCG
138R	Residential	Residence	Felty	2552	N. 43rd St	To be re-sampled	Cadmium exceedence of PCG
192R	Residential	Residence	Manso	4202	Cookson Rd	To be re-sampled	Cadmium exceedence of PCG
196R	Residential	Residence	Whalen	2758	N. 42nd St	To be re-sampled	Cadmium exceedence of PCG
200R	Residential	Residence	Gomez	2831	N. 45th St	To be re-sampled	Cadmium exceedence of PCG
256R	Residential	Residence	Mottin	2832	N. 43rd St	To be re-sampled	Cadmium exceedence of PCG
264R	Residential	Residence	Quintero	2705	N. 41st St	To be re-sampled	Cadmium exceedence of PCG
334R	Residential	Residence	Aleman	4009	Maple Ave	To be re-sampled	No 10-4 Risk Exceedences	Arsenic exceedence of IL background
355C	Comm/Ind	Commercial	Village of Fairmont City		N. 41st St	To be re-sampled	Lead exceedenceof PCG at depth only (12-18")	
444R	Residential	Residence	Cleaves	2505	N. 38th St	To be re-sampled	No 10-4 Risk Exceedences	Arsenic exceedence of IL background
472R	Residential	Vacant	HavaHome, LLC		N. 49th St	To be re-sampled	Cadmium exceedence of PCG	
Properties where acess was previously denied for sampling during the TCRA and/or RI							
	Residential	Residence	Robert McCartney	2323	N. 48th St.	Denied access in 2002 and 2006 - to be sampled if access is obtained	
	Residential	Residence	Judy LaRussa	2756	N. 41st St	Denied access in 2002 and 2006 - to be sampled if access is obtained	
	Residential	Residence	Betty Kumar	3918	Cookson	Denied access in 2002 and 2006 - to be sampled if access is obtained	
	Residential	Vacant	Joyce Mora	2769	N. 43rd St	Denied access in 2002 and 2006 - to be sampled if access is obtained	
	Residential	Residence	William and Barbara Arnold	2817	N. 43rd St	Denied access in 2002 and 2006 - to be sampled if access is obtained	
	Residential	Vacant	Holy Rosary Catholic Church		Cookson & 43rd	Denied access in 2006 - to be sampled if access is obtained	
	Residential	Residence	Betty Berning	5524	Kinder Drive	Denied access in 2006 - to be sampled if access is obtained	
	Residential	Residence	Julian Perez	5502	Kinder Drive	Denied access in 2006 - to be sampled if access is obtained	

N

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LEGEND

AREAS TO BE SAMPLED

NOTE:
1. FIGURE BASED ON INFORMATION INCLUDED IN RI/FS FIGURES BY ENTACT
2. ADDRESSES TO BE VERIFIED IN FIELD

BLUE TEE CORP.
OLD AMERICAN ZINC SITE
FAIRMONT CITY, ILLINOIS
RD WORK PLAN

OFF FACILITY AREA PROPERTIES TO BE SAMPLED

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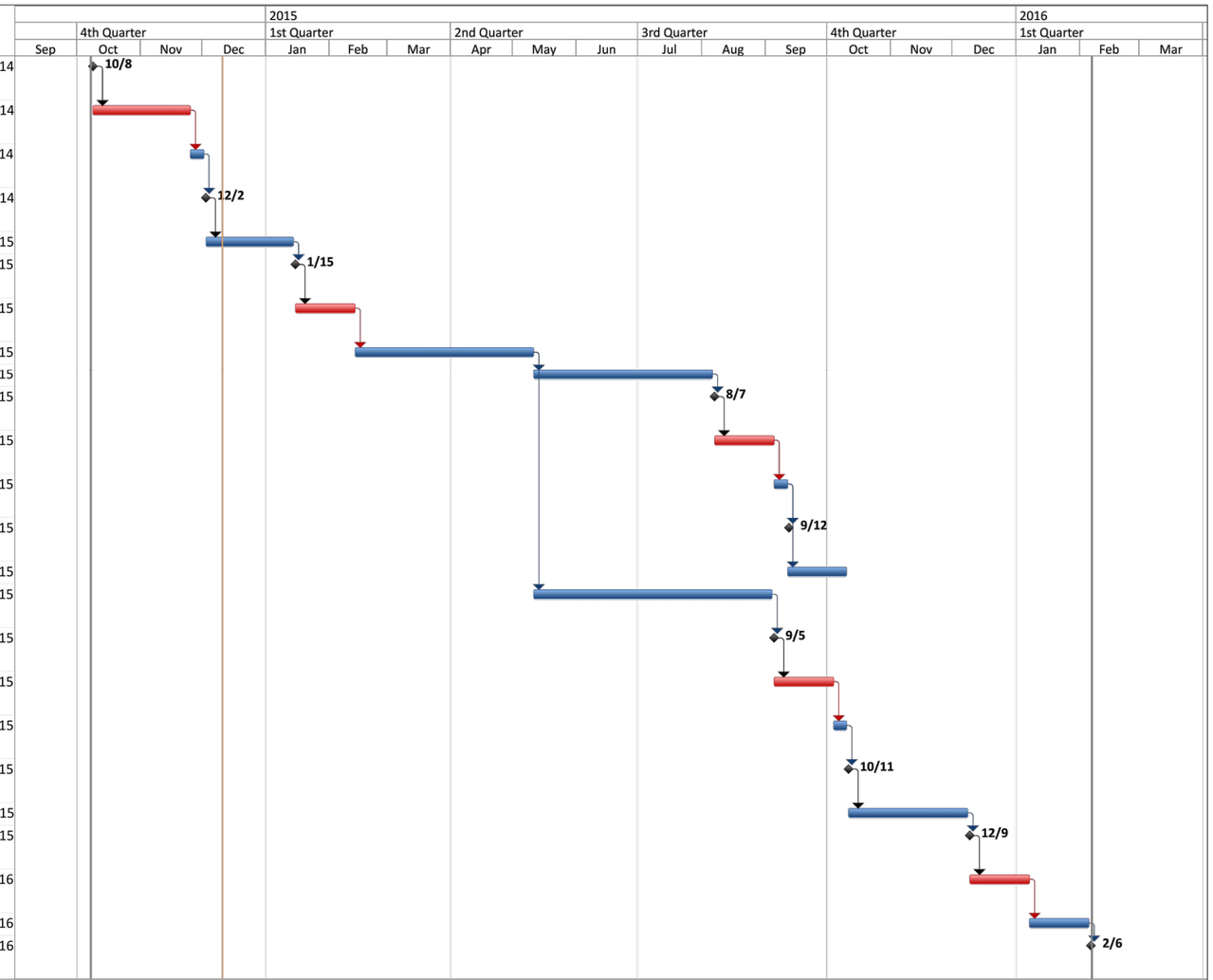
FIGURE
5

ID		Task Name	Duration	Start	Finish
1		Draft RD Work Plan Submitted to USEPA	1 day	Wed 10/8/14	Wed 10/8/14
2		USEPA Review of Draft RD Work Plan	49 days	Thu 10/9/14	Tue 11/25/14
3		Blue Tee Review Comments	1 wk	Tue 11/25/14	Mon 12/1/14
4		Comment Review Meeting	1 day	Tue 12/2/14	Tue 12/2/14
5		Finalize RD Work Plan	44 days	Wed 12/3/14	Wed 1/14/15
6		Final RD Work Plan Submittal to USEPA	1 day	Wed 1/14/15	Thu 1/15/15
7		USEPA/IEPA Review of Final RD Work Plan	30 days	Thu 1/15/15	Fri 2/13/15
8		PDI Field Work	90 days	Fri 2/13/15	Mon 5/11/15
9		PDI Report	90 days	Mon 5/11/15	Thu 8/6/15
10		PDI Report Submittal to USEPA	1 day	Thu 8/6/15	Fri 8/7/15
11		USEPA and IEPA Review of PDI Report	30 days	Fri 8/7/15	Sat 9/5/15
12		Blue Tee Review Comments	1 wk	Sat 9/5/15	Fri 9/11/15
13		Comment Review Meeting	1 day	Sat 9/12/15	Sat 9/12/15
14		Prepare Final PDI Report	30 days	Sat 9/12/15	Sat 10/10/15
15		Preliminary RA Design and Report	120 days	Mon 5/11/15	Fri 9/4/15
16		30% RA Design Submittal	1 day	Fri 9/4/15	Sat 9/5/15
17		USEPA/IEPA Review of 30% RA Design	30 days	Sat 9/5/15	Sun 10/4/15
18		Blue Tee Review Comments	1 wk	Sun 10/4/15	Sat 10/10/15
19		Comment Review Meeting	1 day	Sat 10/10/15	Sun 10/11/15
20		Draft Final RA Design	60 days	Sun 10/11/15	Tue 12/8/15
21		Meeting and Draft Final RA Design Submittal	1 day	Tue 12/8/15	Wed 12/9/15
22		USEPA/IEPA Review of Draft Final RA Design	30 days	Wed 12/9/15	Thu 1/7/16
23		Finalize RA Design	30 days	Thu 1/7/16	Fri 2/5/16
24		Submittal of Final RA Design	1 day	Fri 2/5/16	Sat 2/6/16



Project: RD Work Plan Schedule rev 2
Date: Thu 12/11/14

Task	Summary	External Milestone	Inactive Summary	Manual Summary Rollup	Finish-only
Split	Project Summary	Inactive Task	Manual Task	Manual Summary	Deadline
Milestone	External Tasks	Inactive Milestone	Duration-only	Start-only	Progress

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NOTE:
RED BARS REPRESENT USEPA/IEPA REVIEW

BLUE TEE CORP.
OLD AMERICAN ZINC SITE
FAIRMONT CITY, ILLINOIS
RD WORK PLAN

RD SCHEDULE

ARCADIS

FIGURE
6

Appendix A

Field Sampling Plan

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Appendix B

Quality Assurance Project Plan

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Appendix C

Health & Safety Plan